(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 487 145 A3

(12) EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
28.08.2019 Bulletin 2019/35

(43) Date of publication A2:
22.05.2019 Bulletin 2019/21

(21) Application number: **18207142.3**

(22) Date of filing: **20.11.2018**

(51) Int Cl.:
H04L 29/06 *(2006.01)* ***H04L 29/08*** *(2006.01)*
H04L 29/12 *(2006.01)* ***H04L 12/66*** *(2006.01)*

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **21.11.2017 KR 20170155531**

(71) Applicant: **Doosan Heavy Industries & Construction Co., Ltd**
Changwon-si, Gyeongsangnam-do 51711 (KR)

(72) Inventors:
- **CHOI, Jong Min**
  Gyeonggi-do 17002 (KR)
- **SEO, Young Hoon**
  Gyeonggi-do 16512 (KR)

(74) Representative: **Ter Meer Steinmeister & Partner Patentanwälte mbB**
Nymphenburger Straße 4
80335 München (DE)

(54) NODE MANAGEMENT GATEWAY DEVICE IN DISTRIBUTION NETWORK AND GRID NETWORK AND METHOD THEREOF

(57) A distribution network system having a plurality of nodes using a scheme for data-centric objectoriented communication (DDS) effectively manages the frequently occurring connections for each node and the real-time addition or deletion of a node. Each node includes a gateway connected to a Wide Area Network (WAN) and configured to transmit and receive a message using a Real-Time Publish-Subscribe (RTPS) protocol that applies simple tunneling to communicate as if all nodes communicate in a Local Area Network (LAN), and to insert magic information into a header of the message, the inserted magic information including source IP information of the message, destination IP information of the message, and destination User Datagram Protocol (UDP) information of the message.

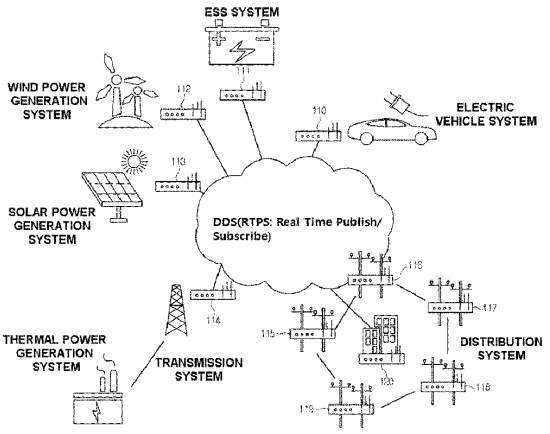

Fig. 2

EP 3 487 145 A3

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 18 20 7142

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	WO 2015/059128 A1 (THOMSON LICENSING [FR]) 30 April 2015 (2015-04-30) * page 2, line 1 - page 4, line 27 * * page 5, line 15 - page 8, line 14 * * figures 1, 4 *	1,4-8 2,9,10	INV. H04L29/06 H04L29/08 H04L29/12 H04L12/66
A	KR 101 157 039 B1 (AGENCY DEFENSE DEV [KR]) 21 June 2012 (2012-06-21) * paragraph [0001] - paragraph [0010] * * paragraph [0023] - paragraph [0036] * * figures 2, 4-6 *	1-8	
Y	DAVID C PLUMMER (DCP@MIT-MC): "An Ethernet Address Resolution Protocol -- or -- Converting Network Protocol Addresses to 48.bit Ethernet Address for Transmission on Ethernet Hardware; rfc826.txt", AN ETHERNET ADDRESS RESOLUTION PROTOCOL -- OR -- CONVERTING NETWORK PROTOCOL ADDRESSES TO 48.BIT ETHERNET ADDRESS FOR TRANSMISSION ON ETHERNET HARDWARE; RFC826.TXT, INTERNET ENGINEERING TASK FORCE, IETF; STANDARD, INTERNET SOCIETY (ISOC) 4, RUE DES F, 1 November 1982 (1982-11-01), XP015006811, * abstract * * page 3 - page 5 *	2,9,10	TECHNICAL FIELDS SEARCHED (IPC) H04L
X A	US 2008/151875 A1 (LIM PYUNG-BIN [KR]) 26 June 2008 (2008-06-26) * paragraph [0015] - paragraph [0023] * * paragraph [0036] - paragraph [0051] * * paragraph [0082] - paragraph [0092] * * figures 1-4 *	3,11,12, 14 13,15	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	11 July 2019	Durand-Schaefer, R

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

Europäisches Patentamt
European Patent Office
Office européen des brevets

Application Number
EP 18 20 7142

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

Europäisches Patentamt
European Patent Office
Office européen des brevets

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 18 20 7142

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1, 6-8(completely); 2-5(partially)

   Gateway that implements data-centric object-oriented communication by transmitting and receiving publish-and-subscribe messages and inserting source and destination IP information and UDP information in the header of the messages

   ---

2. claims: 9, 10(completely); 2, 4, 5(partially)

   Method for transmitting ARP requests and receiving ARP replies over a WAN and sending messages based on the received ARP replies

   ---

3. claims: 11-15(completely); 3(partially)

   Method for receiving IP information from a destination device and converting the IP information based on a virtual subnet mapping table

   ---

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 18 20 7142

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

11-07-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2015059128 A1	30-04-2015	NONE	
KR 101157039 B1	21-06-2012	NONE	
US 2008151875 A1	26-06-2008	KR 20080058791 A	26-06-2008
		US 2008151875 A1	26-06-2008

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82